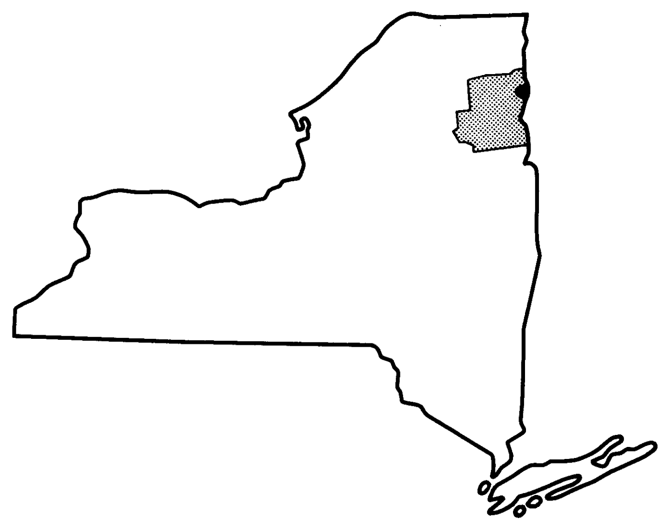
FLOOD INSURANCE STUDY

TOWN OF ESSEX, NEW YORK
ESSEX COUNTY



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Federal Emergency Management Agency

COMMUNITY NUMBER - 361149

NOTICE TO FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

TABLE OF CONTENTS

TABLE OF CONTENTS - continued

FIGURES

TABLES

EXHIBITS

FLOOD INSURANCE STUDY
TOWN OF ESSEX, ESSEX COUNTY, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Essex, Essex County, New York, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the Lake Champlain portion of this study were taken from the Flood Insurance Study for Town of Plattsburgh, prepared by Camp Dresser & McKee, Environmental Engineers, for the Federal Emergency Management Agency (FEMA), under Contract No. H-3832.

1.3 Coordination

On May 7, 1986, a final Consultation and Coordination Officer's (CCO) meeting, attended by representatives of FEMA, the town, and the State of New York, was held to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Essex, Essex County, New York. The area of study is shown on the Vicinity Map (Figure 1).

Lake Champlain was studied by detailed methods for its entire shoreline within the community based on a lake level frequency analysis done in 1976. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

The Bouquet River was studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Essex.

2.2 Community Description

The Town of Essex is located in northeastern Essex County, New York. It is bordered by the Town of Willsboro to the north, the Town of Lewis to the west, the Town of Westport to the south, and Lake Champlain to the east.

Lake Champlain is a glacial lake with a north-south orientation, forming the border between New York and Vermont. Its total length is over 100 miles. At its widest part, between Plattsburgh and Burlington, the lake is approximately 22 miles wide. At the Canadian border, where the lake empties into the Richelieu River, its drainage area is 8,277 miles.

The mean minimum temperature in the area in January is 9 degrees Fahrenheit (°F), and the mean maximum temperature in July is 83°F. The mean annual precipitation is approximately 30 water-equivalent inches; the mean seasonal snowfall is approximately 60 inches (Reference 1).

2.3 Principal Flood Problems

High-water levels on Lake Champlain result from a complex combination of climatic conditions that characterize the winter period throughout its drainage area. The conditions most conducive to flooding along the lake shore are freezing temperatures and a large quantity of snowfall throughout the winter, followed by a sudden period of warm and rainy weather without a refreeze. Such a combination has occurred in varying intensities in the past and has resulted in flood damages along the shore. To aggravate this flooding, the ice sheet on the lake's surface

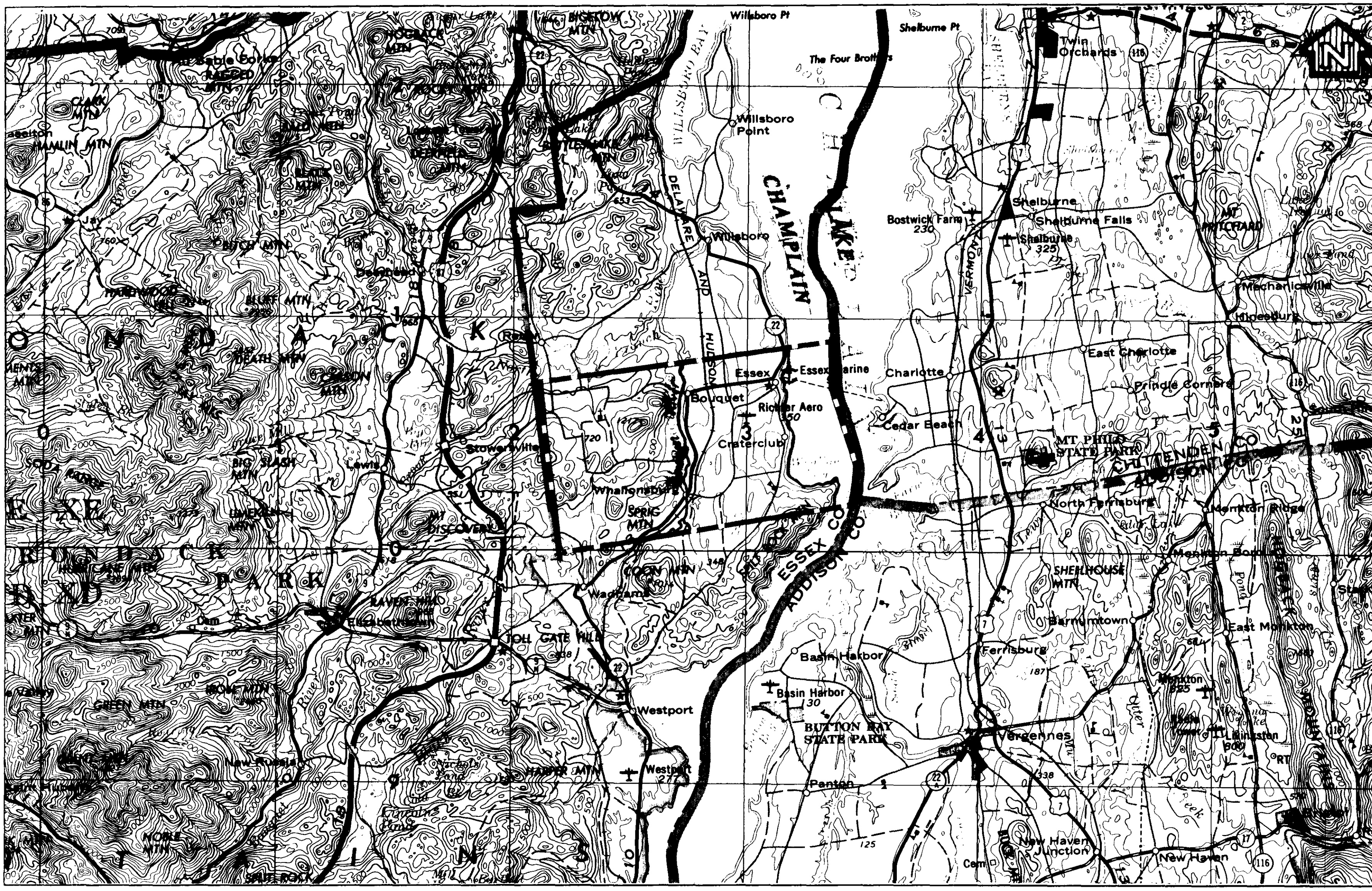

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF ESSEX, NY

(ESSEX CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

has been so thick at times that it did not readily melt with the onset of warm weather. The result has been that the large volume of water in the lake has lifted the ice, and strong winds have forced it ashore, crushing lake front structures in its path. It is estimated that ice can exert a force of up to 30,000 pounds per square inch, enough to pulverize a concrete wall (Reference 2).

On May 4, 1869, Lake Champlain was at its highest level in the last 150 years at 102.1 feet. In April 1903, the lake stage reached an elevation of 101.8 feet. In March 1936 and April 1976, it reached elevations of 101.61 and 101.64 feet, respectively.

High-lake stage accompanied by wind-driven waves aggravates the flooding problem and increases the risk of property damage. Local residents have reported encountering waves as high as 8 feet on Lake Champlain and have seen 6-foot waves break against cliffs along the shore.

Gage information from U. S. Geological Survey (USGS) gage No. 04294500 at Burlington, Vermont, and USGS gage No. 04295000 at Rouses Point, New York, was utilized for this study.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic and Hydraulic Analyses

Analyses were carried out to establish the peak elevation-frequency relationships for the flooding source studied in detail affecting the community.

The hydrologic information for Lake Champlain was taken from the Flood Insurance Study for the Town of Plattsburgh, the analysis for which was completed in 1976 (Reference 3). The USGS measures lake stages at two gaging stations on the northern end of Lake Champlain: No. 04294500 at Burlington, Vermont; and No. 04295000 at Rouses Point, New York. The data from the Rouses Point gage were used for this analysis because its on the western shore of Lake Champlain, because its period of record (1871 to present) is longer than that of the Burlington gage, and because examination of the records of these gages shows that the lake stages at both locations are very similar.

Graphical frequency analysis was chosen as the method most likely to determine lake stages of the selected recurrence intervals with a reasonable degree of accuracy. The results of this analysis were plotted on an arithmetic-probability graph (rather than a logarithmic-probability graph), which allows data points to vary over a wider range. This flexibility would help to describe a stage-frequency curve more accurately and would reduce the human error introduced in fitting a curve through the plotted points. It was decided not to employ the log-Pearson Type III frequency analysis because the range of logarithms of the lake stage data is too narrow to yield reliable results.

Three graphical frequency analyses were applied to the data measured at the Rouses Point gage from 1871 to 1976. They were the Weibull and Hazen Formulas, and the Beard Method (References 4 and 5). The stages for Lake Champlain presented in this report were obtained from the stage-frequency curve produced by the Beard Method because this curve appears to be an average of the curves produced by the other two formulas.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD).

A summary of peak elevation-frequency relationships for Lake Champlain are given in Table 1, "Summary of Stillwater Elevations."

TABLE 1 - SUMMARY OF STILLWATER ELEVATIONS

	ELEVATION (feet)			
FLOODING SOURCE AND LOCATION	10-YEAR	50-YEAR	100-YEAR	500-YEAR
LAKE CHAMPLAIN				
At Rouses Point, New York	101.01	101.76	101.97	102.32

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year flood plain boundaries and 100-year floodway to assist communities in developing flood plain management measures.

4.1 Flood Plain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the flooding source studied in detail, the 100- and 500-year flood plain boundaries have been delineated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 6).

For the stream studied by approximate methods, the 100-year flood plain boundary has been delineated using the Flood Hazard Boundary Map for the Town of Essex (Reference 7).

The 100- and 500-year flood plain boundaries are shown on the Flood Insurance Rate Map (Exhibit 1). On this map, the 100-year flood plain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year flood plain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the stream studied by approximate methods, only the 100-year flood plain boundary is shown on the Flood Insurance Rate Map (Exhibit 1).

4.2 Floodways

The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights.

The floodway concept is not applicable to lascustrine flooding; therefore, no floodways are shown in this study.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year flood plain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal flood plains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal flood plains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year flood plain, areas within the 500-year flood plain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and flood plain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year flood plains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For flood plain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year flood plains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

A Flood Insurance Study has been prepared for the Town of Lewis (Reference 8). The results of that study are in complete agreement with the results of this study. Flood Insurance Studies for the Towns of Willsboro and Westport are currently being prepared (References 9 and 10). The results of those studies will be in exact agreement with the results of this study.

In 1937, the International Joint Commission of the United States and Canada recommended the construction of a dam and levess at Fryers Island in the Richelieu River upstream of St. Jean, Quebec, to control perennial flooding experienced along the river in the spring. The dam was built but never put into operation because the levees were not built; therefore, flooding has continued. Increased development in the flood plain of the river, which consists of excellent soil for agriculture, has resulted in increased damages during spring floods. The situation is so severe that the Commission is again seeking to determine the best solution to the problem. Although the Commission has published a maximum 100-year lake stage of 101.42 feet, more recent developments have caused it to reconsider this analysis (Reference 11). They have found that factors only now becoming evident should be taken into account. One of these is the incongruity of higher lake levels over the past decade without the attendant increase in discharge in the Richelieu River that would be expected. In fact, an increase in weed growth has been noted in the river, which would indicate a decrease in discharge. The Commission is currently studying the environmental impacts of control measures and restudying the hydrology and hydraulics of the lake and river.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 26 Federal Plaza, Room 1351, New York, New York 10278.

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